133 example, means "Big Snow." But local people in many communities use the same name when they refer to other mountains. The name Himalaya, incidentally, is Tibetan for "Snow Mountain."[5]

The rivers on the west side of this region are turbulent flows and objects of fear and superstition to the aborigines. Bamboo-cable bridges and buffalo-skin rafts are dangerous and impractical means for crossing these rivers. In this connection, accounts of the construction of the Hui-t'ung Bridge on the "Stilwell Road" in western Yunnan and the Communist epic crossing of the Ta-tu River in eastern Sikang during the 1934-35 Long March should be recalled. P tions of the rivers in Szechwan Province, where wooden junks serve as local transport, are navigable; other rivers in this region are not.

B. Plains and Lakes

133 311 The Chengtu Plain, heart of the Szechwan Basin, is undoubtedly the largest area of level land in this region -- 6,000-7,000 square kilometers (2,280-2,680 sq. mi.).[6] It is extensively cultivated, and its productivity equals

5. Ko Sui-ch'eng, Chung-kuo Ti-li Hsin Chih [New Geography of China], Shanghai, Chung-hua shu-chü, 1950, chap. IX, p. 243.

6. Chiang Chün-chang, Hsi-nan Ching-chi Ti-li [The Economic Geography of Southwest China], Shanghai, The Commercial Press, 1946, pp. 9-25.

1:Stanford U. S-4, 5 1956 AF16 SW China AF16

133 the riparian "rice-bowl" section of Hunan
311 Province to the east. The Chung-pa Plain, northeast of Chengtu in the same province, is
133 another extensive flatland. Outside the basin, the plains are scattered and consist of high valleys between towering mountains or "grasslands" on the Tibet-Sikang highland. The expansive valley around Kweiyang, provincial capital of Kweichow, for example, is about 1,000 meters (3,200 ft.) above sea level. Similar in nature is the Kunming plain, except that it rises to a height of 2,000 meters (6,400 ft.). Farther north are the flat stretches around Pa-an (or Pa-t'ang) on the former Ch'ang-tu--Sikang border, which is an open section of the Golden Sand River valley, rising 2,600-3,000 meters (8,360-9,600 ft.).[7] Many small lakes are found in these plains. The Szechwan Basin, with its lattice work of waterways, is without lakes, but Yunnan, Kweichow, and the former Sikang Province have many. Ts'ao-hai Lake in Kweichow and Erh-hai and T'ien-ch'ih lakes in Yunnan, are noted bodies of water. Warm springs also abound in these two provinces.

132 C. Climate

The climatic zones in this region are best

7. Ibid., pp. 9-11.

1:Stanford U. S-4, 5 1956 AF16 SW China
[redacted] AF16

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There are other factors which give to much of the area we are now considering important uniformities in culture. The expansion of "Chinese culture" from Honan and Shantung into the whole of south and southwest China was essentially the steady outward push of an efficient agricultural technique which displaced the more primitive aboriginal food-gatherers and primitive slash-burn agriculturists, absorbed most of these people into its operation, and drove the remnants higher and higher into the hills. This process is still going on in upland areas of the Southwest. The characteristically Chinese agriculture is intensive, that is, it uses large quantities of human labor in irrigating, fertilizing, and cultivating land for maximum yields. Its unit of socio-economic organization is the village, composed of those families which cultivate the surrounding fields within easy walking distance. It was in the villages of rural China, spread over a vast area to exploit the land through a common technology, that the characteristic way of life developed. It is his family's village which is "home" to any Chinese, no matter what his class, how far he may wander, or how Westernized his life may have become. There are perpetuated the ties with his own family's past, symbolized by the ancestral temple and the family or clan burial ground. There are the other families

735 authority so complete as to lead to a state of near anarchy."[2]

178 311 The characteristic way of life of the peasants has been slowly disintegrating under manifold pressures. During prosperous periods in the past a delicate balance of human and economic factors fostered a crowded, conformist, but on the whole harmonious village life. Recent decades have seen the old harmony replaced by tension and a predatory struggle for survival. And, despite the isolation of most villages, ideas and ideals from the West have slowly undermined the authority of the older mores and customary laws.

178 Despite all the fissures that have developed, it is well to remember that peasant life everywhere has a tremendous inertia, that it is incredibly resistant to all the forces of

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2. Maurice Zinkin, Asia and the West, London 1951, p. 111. H.L. Richardson, commenting in 1942 on Szechwan -- usually regarded as a fertile and prosperous province -- says: "The condition of the individual farmers is less happy than the prosperity of the Province as a whole would suggest, and the pressure of the whole population on the supplies of food and other agricultural products, such as cotton, is very intense." Cressey, op. cit., pp. 178-79.

1:Stanford U. S-4, 5 1956 AF16 SW China
AF16

census completed by the Communists in June 1953. If we assume the ratio of rural and urban populations to be 87 to 13, the rural population in the Southwest Region in 1953 was approximately 85 million.[2] A comparison of the rural population and the total amount of cultivated land in this region in the years 1946 and 1953 is presented in Table 1.

Table 1. Cultivated Land and Rural Population of Southwest China*

Unit = 1,000. S = shih-mou. A = acres.

Province	Year	Cultivated Land	Rural Population	Farm Households	Shih-mou (acres) per Household	Shih-mou (acres) per Capita
Szechwan	1946	181,427 S (28,239 A)	38,957	6,386	23.8 S (3.9 A)	3.9 S (0.6 A)
	1953	181,674 S (25,279 A)	54,204	8,930	16.9 S (2.8 A)	2.8 S (0.5 A)
Sikang	1946	4,011 S (668 A)	1,668	278	14.5 S (2.4 A)	2.4 S (0.4 A)
	1953	4,111 S (685 A)	2,942	485	8.5 S (1.4 A)	1.4 S (0.2 A)
Yunnan	1946	28,219 S (4,369 A)	7,169	1,384	18.9 S (3.2 A)	3.7 S (0.6 A)
	1953	25,375 S (4,396 A)	15,251	2,965	8.7 S (1.5 A)	1.7 S (0.3 A)
Kweichow	1946	23,173 S (3,862 A)	6,182	1,193	19.4 S (3.2 A)	3.7 S (0.6 A)
	1953	23,273 S (3,879 A)	13,082	2,586	9.0 S (1.5 A)	1.8 S (0.3 A)
		Total	Total	Total	Average	Average
	1946	264,836 S (34,136 A)	53,976	9,287	28.1 S (3.2 A)	3.4 S (0.6 A)
	1953	265,433 S (34,239 A)	85,479	15,966	16.6 S (1.8 A)	1.9 S (0.3 A)

* For 1946 data, Statistical Year Book of the Republic of China, Nanking, 1948, pp. 70-71. For 1953 data, Communist census of 1953 and Chung-hua jen-min kung-ho-kuo fen-sheng Ti-t'u /_Atlas of the People's Republic of China by Provinces_/, Shanghai, 195-, pp. 42-46.

2. Ibid.

1:Stanford U. S-4, 5 1956 AF16 SW China
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311 In 1955, the lowest average land holding per farm household was 8.5 shih-mou (1.4 acres) in Sikang Province; the highest average land holding per farm household was 16.9 shih-mou (2.8 acres) in Szechwan Province. The average for Szechwan is 12 per cent higher than the national average.[3]

III. LAND REFORM

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565 The Land Reform Movement, as it affected the Southwest China region, had been partially completed in September 1951. Approximately 37 million inhabitants, in an area which included 172 hsien and 8 municipalities, had been subjected to "land reform."[4] The Communist regime had organized "poor peasants" and "farmhands" to unite with "middle peasants" in order to nullify the power of "rich peasants" and to abolish the "landlord system." The Land Reform Movement continued on to 1953. In the spring of that year, of the approximately 85 million persons who made up the rural population of the Southwest Region less than 2.2 million inhabitants had not yet experienced "land reform."[5] In spite of the vast scale on which

3. Mao Tse-tung's report, "The Collectivization Movement," Hua-ch'iao Jih-pao [China Daily News], New York, Oct. 28, 1955.

4. Hsin-hua Jih-pao [New China Daily], Chungking, Nov. 21, 1951.

5. Ibid., Dec, 13, 1952.

2: Rock K-5 (1934-) 1947 AF16 Southwest China AF16

Of the forests only a remnant remains, the Lo-lo having burned the huge oaks, in fact cleared the whole mountain-side. After ploughing the ashes under, they plant their buckwheat for one or two years, and then move on again, leaving behind them desolation, only to repeat the performance elsewhere. The slopes of the snow range are terrifically steep and once denuded of their forests, the land of the villages below in the Yangtze valley, of which only a narrow margin is arable, will be in danger of being washed away by the floods descending from the mountain. It is a pity that the government is indifferent to the preservation of the magnificent forests which still exist in this region, and allows whole areas to be laid waste by Lo-lo and Chinese alike. The Lo-lo are the greatest enemies to forests: wherever one meets that tribe one finds desolation; countless charred and fallen trees cover the landscape. When they are in need of firewood they will cut down additional trees instead of utilizing those already lying about by the thousand. This is especially true where they have settled in pine forests, as at Ghügh-t'o, north of Li-chiang (p. 231).

From this forest-remnant we emerge on to a small alpine meadow called Ngv-dzü, elevation 10,200 feet, and continue down the valley, crossing several lateral streams, the last of which is called Lă-ngu-dtô. At 8,800 feet, where the stream and valley make a sharp bend west, we enter pine forest, at the upper end of which is a clearing called T'o-k'ö-shĕr (Long foot of the pine). Here in this forested valley not a breath of wind is stirring, while the eastern slopes of the snow range and the northern plain are swept by gales in the late winter and early spring, and the snow blown off the peaks and spurs in great masses resembling clouds. From T'o-k'ö-shĕr a trail branches north and follows on the middle slopes of the range to a famous cave called T'ai-tzu tung 太子硐, which is described separately. The trail to the Yangtze descends steeply through what is left of the once magnificent pine forests.

Most of the building lumber for Li-chiang comes from these forests; a dozen boards an inch thick, 12 feet long, and 1 foot broad, sell for Yün-nan $3, or about Chinese $1.50 delivered. The boards are of various sizes and grades, the smaller ones selling for Yün-nan $2.50 a dozen. This is reckoned in pre-war silver dollars.

The trail winds through the forest, but does not descend straight to the Yangtze. It turns north to a gap known as Ma-an Shan 馬鞍山 (Horse-saddle Mountain), past a hamlet called Zi-shĕr-dto (Long grass hill) and the little village of Bbu-k'aw-dtü nestled against the valley wall below. This mountain path skirts several lateral valleys before and after reaching Ma-an Shan, where the Yangtze becomes first visible as a broad blue-green band, hemmed in to the west by a range 13,000–14,000 feet in height. Here in the river valley below are situated various hamlets, as Llü-tsu-ndu across on the west bank, and others further up-stream on the east bank, near the mouth of the valley down which the trail leads to the Yangtze. An alluvial fan extends into the Yangtze valley, and here are situated the villages of Dzä-bpö-dzü, Gkv-na-wùa and Llü-dtü-man.

The trail continues through pine forest, at an elevation of between 7,800–7,400 feet, to a bluff of the latter height, from which the Yangtze valley can be viewed to advantage, up-stream as far as A-khi. Down-stream, the

2: Rock K-5 (1934-) 1947 AF16 Southwest China AF16

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PLATE 161.—THE MEKONG NEAR THE NA-KEH VILLAGE OF LO-HSU (Courtesy Am. Geog. Soc.)

Photographed, looking upstream, from a lateral spur immediately north of Ba-dö. The village of Lo-ché is visible to the right on a terrace above the Mekong.

[p.298 I]

2: Rock K-5 (1934-) 1947 AF16 Southwest China AF16

yao wei-yüan was abolished and a magistrate appointed in his stead. The boundary, where the district is surrounded by the four snow ranges, has not yet been delineated.

"It is believed that the border of the district extends east to Pen-tzu-lan, adjoining the Chung-tien and Ba-thang (Pa-t'ang) districts and the Yang-tze. In the north it extends to Pi-yung-kung 乙明工, the Ch'a-li Hsüeh-shan 茶里雪山, and to Yen-ching on the Ssu-ch'uan (now Hsi-k'ang) border. The A-tun-tzu district according to Chinese records comprises about 1,000 square li, and 12,000 inhabitants. There is much snow and the climate is raw and cold. The inhabitants are mostly Tibetans and Mo-so [Na-khi]; a few Chinese, also Moslems and natives of Shensi several ten families, also reside there. There are in all four Hsiang 鄉 (suburban districts), viz., Mou-ting 茂頂 [also written Mu-ting 穆頂], A-tung 阿東, Pen-tzu-lan (Pong-tse-ra), and in the west Chiang-hsi 江西. In ancient days there were two native lieutenants, and two T'u-pa-tsung, who ruled over the peasants.

"Arable land is very scarce in the district, and dry grains only are grown. Therefore taxes which are 10 per cent in Wei-hsi, are only 8 per cent in A-tun-tzu. There are over 10 lamaseries in the district belonging to both the Red and Yellow sects. The Catholics are said to have over 100 believers. Of the inhabitants of A-tun-tzu half are lamas. Outside of the few merchants who reside in the town proper, the people are all farmers and shepherds. Salt is taken by them to Chung-tien and Wei-hsi and exchanged for victuals. The main products imported are tea and sugar, while musk, wool, felts and salt are exported. There are no craftsmen or laborers. Rich mineral deposits are found throughout the district. The town of A-tun-tzu possesses a yamen, a school, and a jail. As the inhabitants are ignorant of the Chinese language, and are unable to govern themselves, a Chinese magistrate was established."

(*Translated from manuscript notes attached to an unpublished A-tun-tzu district map in the Government Library in K'un-ming.*)

3. KHA-WA-KAR-PO RANGE (MOUNTAIN OF WHITE SNOW)

The finest mountain range in north-western Yün-nan is undoubtedly Kha-wa-kar-po (written Kha-wa-dkar-po or Khwa-dkar-po) which forms the Yün-nan—Tibet border and the western wall of the Mekong valley (in Tibetan, La Chhu, written gLa Chhu or bLa Chhu according to *Dict., Thib. Lat. Fr.*, p. 687).[9] It extends from north to south and consists of five main peaks of which the southernmost, Me-tse-mo or Yung-chih Hsüeh-shan, is the highest. Although it has never been actually measured I estimate its height to be 21,000 feet. Its Tibetan name Me-tse-mo (written sMad-rtse-mo)[10] means "Lower peak," but not in the sense of being lower in altitude, but as being the southernmost of the range. It stands out isolated towards the east of the main range and is the most beautiful peak of the entire chain, resembling an ice palace of a fairy tale, or an enormous mausoleum with gigantic steps and buttresses, all crowned by a huge, majestic dome of

-2: Rock K-5 (1934-) 1947 AF16 Southwest China AF16
Sino-Tibetan Border AE3

CHAPTER IV

WESTERN AND NORTH-WESTERN YUNG-NING

1. AGRICULTURE, ACCESS AND INHABITANTS

Yung-ning 永寧

S ST 311 [16] ST [24] [31]

The most important part of Yung-ning from an agricultural standpoint, is of course its plain (PLATE 220), which to-day supports 300 families, although 1,000 families could subsist there if rice were cultivated, and all arable land were utilized. Only one half of the plain is now under cultivation, and rice is prohibited from being grown for political reasons. Maize, barley, buckwheat and round peas are the main crops. The plain has a plentiful water supply, as the Hli gyi or K'ai-chi Ho 開基河 [also called Lo-chi Ho 洛基河 pronounced Le-chi Ho in Yung-ning] winds through it, receiving several affluents in its course over the plain. The latter is at an elevation of 9,500 feet, is perfectly flat, and extends east to the foot of Lion Mountain (Seng-ge ga-mu). In the remote past the Yung-ning plain was undoubtedly a lake, similar to the Lu-ku Lake, which lies 100 feet higher. The plain is surrounded by mountains with many valleys debouching into it; the only outlet is the valley which leads into the Ch'ien-so country in Ssu-ch'uan. The eastern and north-eastern end of the plain is still marshy.

The next place of importance is the long Tsui-yi valley called Wa-erh-lo 挖耳羅 in Chinese, which extends south of Wua-ha Shan, west into the Yangtze. This is a very fertile valley and rice is planted in the middle upper half; the lower part is a dry, arid canyon with steep walls; the head of the valley is wooded.

To the west of Yung-ning is another long valley called Luë-dzu law-k'aw, which also extends into the Yangtze, with another valley joining it called Hër-dü, the Har-lër-dü of the Na-khi. These valleys unite a short distance before debouching west into the Yangtze, south of San-chiang-k'ou 三江口. The remaining arable land is along the Yangtze, especially at Pu-chio 卜脚 or Law-k'a-khi-llü [also called P'u-dyü]; then along the Zho Chhu on the Hsi-k'ang border in the west of Yung-ning, and at Pa-erh-ch'iao 壩耳橋, south of Yung-ning; and finally the few fields along the shore of the Lu-ku Hu or Yung-ning Lake.

The rest of the country is exceedingly mountainous. The highest peaks are on Wua-ha Shan, which is the northern part of the Yao Shan to the east of Yung-ning. These reach 15,500 feet or more in height.

S ST 131

Access. — The main approaches to Yung-ning from the south are from Yung-pei, north via Lang-ch'ü chou, the present Ning-lang 寧蒗; then from Li-chiang via the Yangtze at either T'o-lä-tsu or Chiang-wai 江外, up the Tsui-yi valley opposite Chiang-wai which is the shortest route. The northern route is via Feng-k'o 俸可 or Shang-feng-k'o 上俸可.

[p. 388]

5: Davies G-5 (1894-1900) 1909 AF16 Southwest China AF16

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Photo by Captain W. A. Wallis-Jones

Terraced fields in the Shun-ning Fu valley

Plate XVI

[Face p. 74]

5: Davies G-5 (1894-1900) 1909 AF16 Southwest China AF16

of A-lu-shih, which contains 150 houses—a large place for this hilly country. It is inhabited by a people with the bump of curiosity very largely developed.

The next morning we crossed the top of a range at 8,400 feet and from there dropped 3000 feet in three miles to Sung-lin-t'ang, a very small village which contains however a fairly good official rest-house. During this descent the green-coloured water of the Mekong was occasionally to be seen in the deep valley below.

On the 13th a further descent brought us to this river at an elevation of 3,400 feet above the sea. The valley is of exactly the same character as where it is crossed on the Yung-ch'ang–Ta-li road, the river running in a deep gorge, with steep, almost inaccessible, hills rising up from it. There is not an inch of level ground outside the river bed, which is from 80 to 100 yards wide, and is pretty well filled up with water. The current is strong, and rapids numerous.

We crossed by an iron-chain suspension bridge of the same type as those previously described. It is built where the river passes between two precipitous rocks, is 75 yards long, and consists of a plank roadway supported by 14 iron chains, the ends of which are embedded in brick piers. At that time the bridge was a little shaky and swayed about a good deal as one passed over it, and there was a man posted there to warn travellers that only one animal must pass over at a time. After crossing, the road turns westward and follows the river bank for some distance before ascending steeply to Hsin-ts'un, where we put up for the night.

On the 14th February we crossed another range and descended to the town of Shun-ning, always pronounced Shun-ling by the Yünnanese. There is nothing to call a plain here, but a fairly level strip of cultivated ground, half a mile in width, runs along a little stream called the Pei-ch'iao Ho, and tiers of terraced fields rise again above this on each side.

The town is built on the west side of the valley, on the lower spurs of the hills, and is about 5,400 feet above sea level. It is an irregular shaped polygonal a mile in perimeter, surrounded by a 15 feet brick wall backed up on the inside by the usual earth parapet. The space within

5: Davies G-5 (1894-1900) 1909 AF16 Southwest China AF16
Pai-1 AE7

000 range of hills and on the next day dropped steeply down to
S the Nam Ting valley at Mêng-chien. During this descent
361 we passed through the mixed La and Chinese village of
Ta-chai. This contains 450 houses, and though it is a hill
village is quite the largest place in this part of the Chinese
Shan States. It has some very fine trees round it and the
hillsides are well cultivated. It is noticeable that the Las
S and Was live in much larger villages than any other hill
P tribe of Yün-nan.

361 Mêng-chien or Möng Kyen is a small place of no importance, inhabited by Shans. Its height is only 1,850 feet, the Nam Ting valley being one of the lowest parts of Yün-nan. In this warm climate the fresh green grass was already several inches high, and our mules got better grazing than they had had for a long time.

On the 3rd and 4th of March our road was nearly level, leading down the Nam Ting valley, chiefly through pretty thick jungle, with occasionally a Shan village and a patch of rice cultivation where a tributary stream joins the main river. Finally we emerged into the Mêng-ting[1] plain, which is 10 miles long and three miles wide with the river running
S down its northern edge. There are several villages scattered
P about in it, each surrounded by fine clumps of bamboo.
162 The people are partly Chinese Shans and partly Southern
• 311 Shans, the former predominating; but the population is not very large and there is a good deal of land uncultivated.
S Mêng-ting is a very small state, and only the lower or
P western part of this plain belongs to it, the upper half being
361 part of Kêng-ma. The town which is unwalled is built in two bits, separated by a small tributary of the Nam Ting, the sawbwa's residence lying on the right bank, and the market village on the left bank. During the dry season it
S is visited by a good many Panthay traders from Panglong,
P and I saw a large bullock caravan which had come from Nam-hkam with salt fish and cotton clothes.

622 I proposed to go and see the sawbwa, but a message arrived to say that he was ill and not up to receiving visitors. As a matter of fact there was nothing whatever the matter with him, but being of rather a nervous dis-

[1] Also called Hun-ting by the Chinese. Möng Ting is its Shan name.

134 brown" type soil is rich in mineral foods but rather low in humus content and is shallower in depths than the soils of the Chengtu Plain. However, on account of the hilly nature of most parts of the Basin, soil characteristics vary greatly in different local areas.

311 241 In many ways, the distribution of agriculture and forestry and the features associated with these uses of the land are related to and conditioned by one or more of the natural elements characterized in the foregoing paragraphs. Forests mantle the [131] mountain slope, and tree crops are characteristic of many of the hillsides. Agriculture dominates the Chengtu Plain, and is conspicuous along the numerous valley floors and on the terraced hills.

133 311 Of all the natural elements at work in the Basin, topography is a highly important factor that affects the agriculture land use and other forms of cultural life, and the adjustment to this natural element is especially conspicuous. First of all, the close correlation between the cultivated-land index and the topography is most striking. In general, there is a consistent tendency for the cultivated-land index, and the population patterns as well, to decrease from the center of the Basin to the peripheral highlands. Second, the adjustment of the Basin's settlement forms to the topography is outstanding. As in most parts 361 of China, about 85 per cent of the population of Szechuan Basin is rural. But unlike any other part of China, there are comparatively few large villages and nuclear hamlets, with the exception of the Hsien[1] capitals. This remarkable fact is largely a result of the rugged and extremely dissected topography of the Basin. The settlement forms have had to adjust to the local topography. This is particularly true in the eastern and northern parts of the Basin.

312 In the agricultural adjustment to water resources and drainage patterns, the following examples may be noted. First, by seizing the torrential flow of the Min River, the Basin has built not only the oldest but also the most successful and easily-maintained irrigation system of all China. This system has freed the Chengtu Plain from the hazard of floods and droughts, and has insured the unbroken agricultural prosperity of the Basin. This

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[1] Hsien or district in China corresponds somewhat to the county unit of the United States.

?; Hu K-5 (1934-) 1946 AF16 Southwest China AF16

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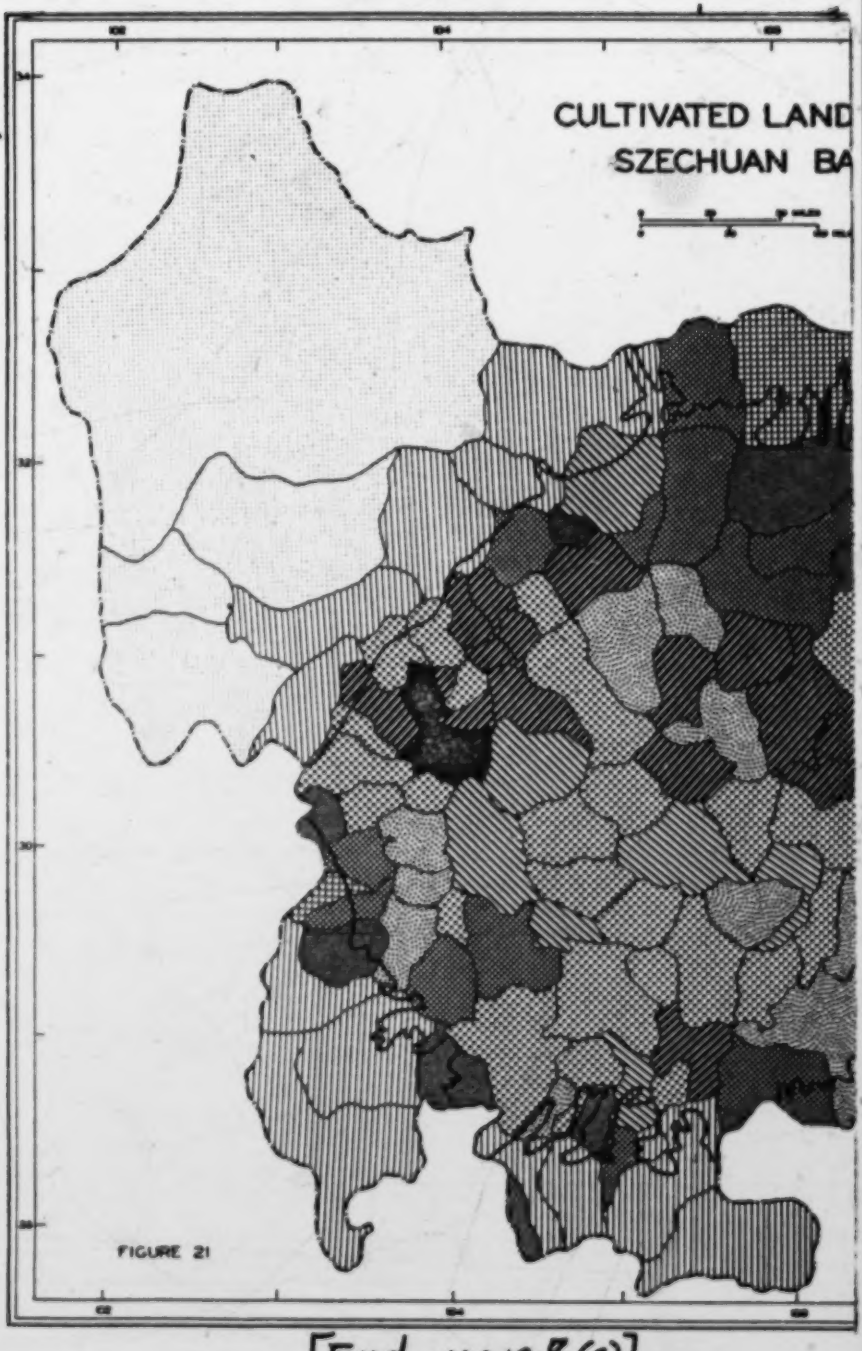

[End map 8(a)]

?; Hu K-5 (1934-) 1946 AF16 Southwest China AF16

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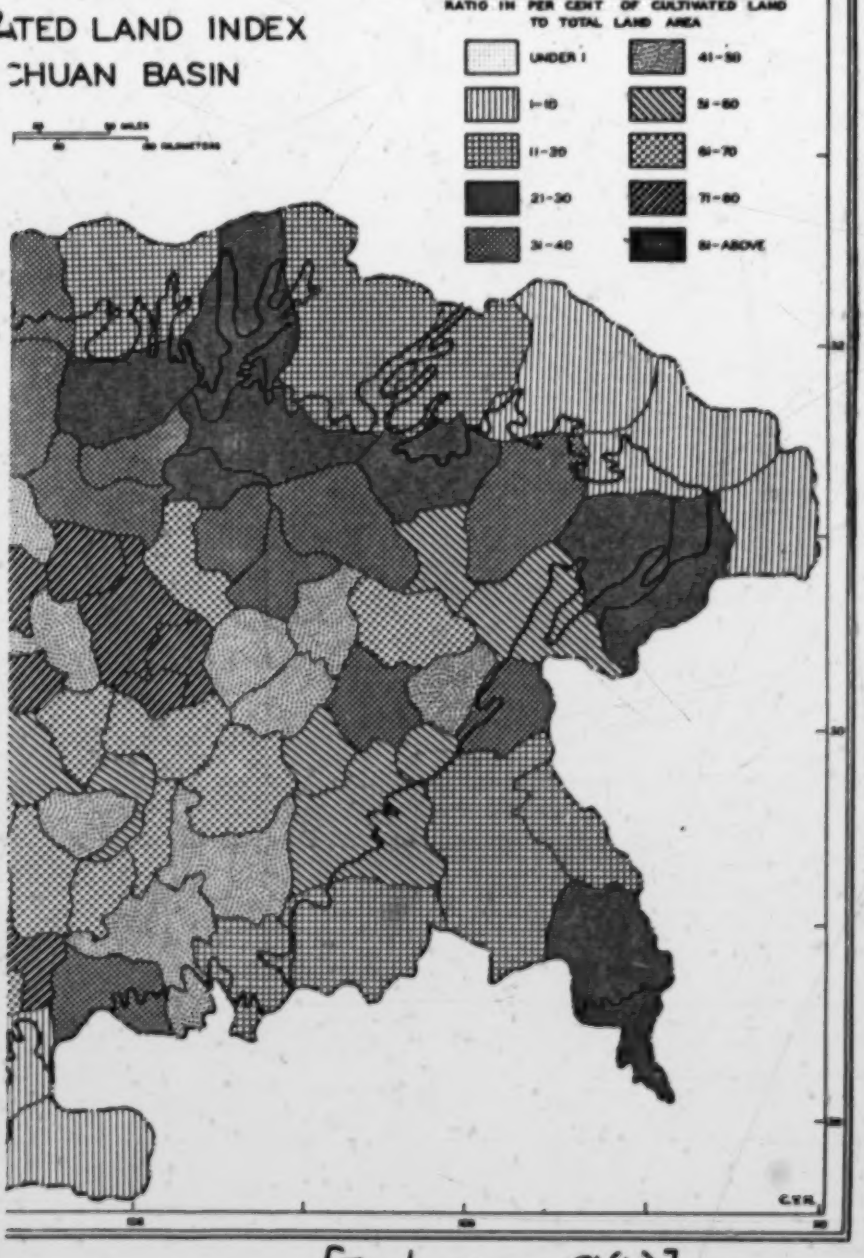
TED LAND INDEX
CHUAN BASIN



[End map 8(b)]

7: Hu K-5 (1934-) 1946 AF16 Southwest China AF16

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frequency of fair days is so adjusted as to reduce competition among the neighboring localities and to afford the greatest advantages to both buyers and sellers. The smooth operation of these schedules illustrates the type of local cooperation which is common in this part of China.

The typical village fair includes a grain merchant, a butcher, several tea houses, a few oil merchants, some firewood booths, vegetable booth, poultry stands, wandering native doctors, dentists, and fortune tellers. In spite of the extremely small area occupied by the fair grounds, it is interesting to note that a kind of system of automatic zoning has come into effect. For instance, it is almost a rule that the grain markets are located at the temple or other spacious grounds, whereas the tea houses, fortune tellers, and the wandering native doctors and dentists always occupy the center areas of the fair.

4. Farms and Field Patterns

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One of the most striking features of the farms of the Basin is the predominance of terraced cultivated fields. Probably nowhere else in all China--with the possible exception of the loessial northwest--does one find the use of slope lands and the building of terraces so universal and so highly perfected as in the Szechuan Basin. Most of the low, round, amphitheater-like hills of the Basin are terraced and cultivated.

The terraced steps are of various widths. Each terrace rises above the preceding one (Fig. 15) and in many cases is faced by a wall of bare sandstones or shales. Each terrace is irrigated from the one below by a small stream of water regulated generally by some simple lifting device, such as a windless, driven by men or animal power. Generally speaking, most of these terraced fields are irregular, depending upon the specific land forms. In Chengtu Plain the fields tend to be rather square or oblong in shape, but most of them have irregular forms, owing to the need of fitting them into irrigation systems. In general, the units of the fields in Chengtu Plain, on account of its more continuous flat topography, are much larger than those in other parts of the Basin.

In the Basin, all land to be planted in rice, whether terraced or otherwise, is put, if possible, under water--generally a little over one foot deep--for the rice season. The field boundaries in most cases follow the natural elevations.

7: Hu K-5 (1934-) 1946 AF16 Southwest China AF16

CHAPTER III

AGRICULTURAL LAND-USE

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311.

Agriculture is the principal form of land-use of the Szechuan Basin. Among all the agricultural regions of China, the Basin is not only one of her richest regions but also, with its greatest diversity and widest range of agricultural products, the Basin represents almost a miniature China. Moreover, it is estimated that approximately 85 per cent of the people gainfully employed in the Basin are engaged either directly or indirectly in agricultural pursuits.[1] In the present treatment of the problem of agricultural land-use in the Szechuan Basin, major attention will be directed to the following points, namely, the land as chief natural resource of the Basin, distinctive features of its agricultural land-use, agricultural land-use in relation to natural elements of the Basin, the principal agricultural areas of the Basin, and the Basin's chief agricultural products.

A. Land: Chief Natural Resources of Szechuan Basin

1. Cultivation-Index and Areal Pattern Thereof

According to the latest report of the Bureau of Military Surveys of Szechuan Province, the total land area of the province is 360,189 square kilometers.[2] The area of the Basin as delimited in the present study is 146,842 square kilometers. The total area under cultivation, for the province as a whole--according to the report (1939) of the Bureau of Central Agricultural Research--is 103,632 square kilometers (Table 2); for the Basin proper (as delimited) it is 68,240 square kilometers. This means the province as a whole has a cultivation-index (ratio of cultivated land to

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[1] Bureau of Interior Affairs, Szechuan Provincial Government, Population Statistics (1937).

[2] Szechuan Provincial Government, Report of the Bureau of Military Surveys (1939).

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total land area) of about 30 per cent, whereas the cultivation-index for the Basin proper runs slightly over 45 per cent. Considering its hilly and dissected topography, this cultivation-index figure for the Basin is fairly high, in fact it compares favorably with some of the flatter and more fertile areas in other parts of China.[1]

The cultivation-index, however, varies greatly in different parts of the Basin. Some areas have an index much higher than 45 per cent, whereas other districts fall far short of it. The peripheral areas of the Basin have a rather low index, ranging between 11 and 20 per cent (Fig. 21). In Chengtu Plain the cultivation-index runs as high as 70 to 80 per cent. In some of the districts of the Plain, particularly in Pi-hsien, Hsin-ching, Wen Chiang, Shuan-liu, and Hua-yang in the southwestern part of the Plain, the figure is even higher than this. On the other hand, in many other districts, including Pei-chuan, Ping-wu, Miao-hsien, Cheng-ko, and Pu-hsi in the northern, northwestern, and northeastern fringes of the Basin, the cultivation-index runs as low as 3 to 5 per cent. Between these two extremes, most of the south central and eastern parts of the Basin have an index ranging between 30 and 50 per cent. Generally speaking, the cultivation-index of the south central districts is somewhat above the general average for the Basin as a whole, whereas the eastern districts fall short of it. The districts on the northern, northeastern, and eastern fringes of the Basin, such as Kuang-yuan, Nanchiang, Wan-yuan, Yun-yang, and Feng-chieh, which have an index of 15 to 20 per cent (Fig. 21), are far below the general average for the Basin as a whole.

These differences in the cultivation-index are clearly explainable if one bears in mind the layout of land forms of the Basin. As in the case of population pattern, the factor of topography plays a very important part. It is almost startling to note the high degree of coincidence which the three maps showing relief, population density, and cultivation-index (constructed from three different sources of data) bear to one another.

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[1] Buck's study reports that the cultivation-index for the Yangtse Rice-wheat area as a whole is 35 per cent, but for the Yangtse Delta alone, the figure is 100 per cent (op. cit., p. 68). In the same study, Buck reports that the cultivation-index for the North-China Plain to be 68 per cent (op. cit., p. 62).

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2. Major Types of Land-Use

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a) General statement.--Concerning the classification of main types of land-use in the Basin, there are no official statistics available. It is, however, estimated[1] that 32 per cent of the total land area is used for farming and its related purposes; 22 per cent for forests, brush, and other undergrowths, particularly bamboo; 3 per cent for graves and graveyards; 2 per cent for pasture; 2 per cent for grasses grown for fuel; 2 per cent for temple grounds; and 37 per cent for miscellaneous uses (including "huang-ti," wild lands or waste lands). These estimates, although no better than cautious guesses, do furnish a general picture as to land-uses and their relative significance.

To a western student of agriculture or geographer this relatively high percentage of total land used for graveyards and temple grounds, and this extremely low percentage in permanent pasture, may seem incomprehensible. Probably here lies one of the most fundamental differences not only between Chinese and western agricultural systems, but also between the two respective cultures. The high percentage of wild or waste land is also striking. This is partly a result of the rugged topography, limited water supply, and poor soil conditions in many sections of the Basin. It also is partly, perhaps mainly, a result of the incessant civil warfare which has prevailed in the Basin during the last twenty years. This misfortune has laid waste to thousands of acres of productive farm lands, and has rendered farm economy bankrupt.

b) Uses of crop land.--It is reported that the total land in crop in the year 1937, for the province as a whole, amounted to 108,174,564 mow (one mow equals one-sixth of an acre), of which 44,952,366 mow, or 43 per cent, were used for "shui-tien" (irrigated fields) or rice paddy fields, and 63,222,198 mow, or 57 per cent, for "hang-tien" (unirrigated fields) or dry-crop lands.[2] With the exception of Chengtu Plain and some other minor river valleys, such as the To and Pou, where a large portion of the crop lands are used for irrigated paddy fields, most of the districts of the Basin, particularly the hilly areas, are generally occupied

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[1] Bureau of Reconstruction, Szechuan Provincial Government, Land Statistics (1937), pp. 83-85.

[2] Bureau of Reconstruction, Agricultural Section, Szechuan Provincial Government, Crop-land Statistics (1937).

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by "hang-ti" or unirrigated "dry" fields.

Dividing the total crop area by the total number of people in the province gives an average of about 2.5 mow of crop land per person. This is very small. It is also calculated that the average size of farm in Szechuan is about 16.3 mow,[1] which is slightly smaller than the average farm in north China (say, for Shantung province, 19 mow), but is much larger than the average size of farm in south or central China (say, for instance, Hunan province 12 mow).[2] The size of the average agricultural land-holding reflects the medium position of the Szechuan Basin.

The most interesting thing about these farms in the Basin lies, however, not so much in their small size but rather in the manner and the intensity with which they are being used. According to Buck,[3] 89.3 per cent of the total farm area in the "Szechuan Rice region" is used for crops; 4 per cent for farmsteads; 4.7 per cent for roads and graves; 0.7 per cent for wooded pastures; 0.7 per cent for forests; 0.4 per cent for pasture land; 0.1 for productive water area; and 0.1 for fuel grasses.

B. Distinctive Features of Agricultural Land-Use in Szechuan Basin

Nyhus, in his study of agricultural regions of China, classified Szechuan as the "west China" region.[4] Buck grouped Szechuan as the "Szechuan Rice" area.[5] Both of these classifications are widely known in the west and have often been quoted in western geographic literatures.[6] However, both of them seem to neglect the most unique features of agricultural practice in the

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[1]Buck's finding for the "most usual size" of farm in the "Szechuan Rice region" is 2.4 acres, or approximately 14.4 mow, which is slightly lower than the figure arrived here (op. cit., p. 269).

[2]Bureau of Statistics, National Government, China, Agricultural Statistics (Nanking, 1933), p. 41.

[3]Buck, op. cit., p. 172.

[4]Paul O. Nyhus, Agricultural Regions of China (Bureau of Agricultural Economics, U.S.D.A., 1931) (maps).

[5]Buck, op. cit., p. 27 (map).

[6]G. B. Cressey, "The Agricultural Regions of Asia," Economic Geography, Vol. X (1934).

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Basin. Particularly, Hymus' classification of Szechuan as the "west China region," which includes large heterogeneous areas with diversified agricultural practice (for instance, Yunnan), fails to bring the agricultural land-use of the Basin into a sharp focus. Buck's treatment, in spite of the rich quantitative data he assembled, is handicapped by the lack of sufficient descriptive materials. Statistics alone, without comprehensive case descriptions, furnish only a dry skeleton which is of limited interest. In his contact with the agricultural practice in the Basin during the past years, the author feels there are a number of unique agricultural practices in the Basin which deserve special mention.

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1. Extraordinary Diversity of Agricultural Products and Intensity of Land-Use

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First of all, the agricultural system of Szechuan Basin is marked both by its extreme diversity of products and by the extraordinary intensity of its land-use. Although the Basin is generally noted and is commonly classified as a "rice region," (and rice is undoubtedly the predominant crop here), a more characteristic feature of its agriculture system is the production of many other unirrigated crops, particularly corn, potatoes, kaoliang, and millet. Nowhere in China, perhaps with the possible exception of Yunnan and Kwangtung provinces, have corn and potatoes become so significant in agricultural production as in the Basin. Moreover, nowhere else in China, perhaps beside the North China Plain and Manchuria, have kaoliang, millet, and soy beans been so widely cultivated as here. It is even more surprising to note that horticultural products so diverse as Lung yen (Euphoria longana), li chi (Litchi chinensis), sugar cane, and citrus fruits of tropical south China, and the best quality pears and persimmons of temperate cold north China are all found growing together here. Agriculturally and horticulturally, here in the Basin, one finds all of China represented in a miniature form.

2. The "Tung-Shui-Tien" System

Another characteristic agricultural practice here is the so-called "Tung-shui-tien" system, literally meaning "winter-storing-water field." In spite of the favorable climate and the fertile soil, and contrary to the popular belief of many western agriculturalists and geographers, large tracts of "ti-tien,"

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show but little evidence of podsolization.[1] A typical profile of this soil is shown below (Fig. 26).[2] These soils are used principally for rice production and some other crops, such as wheat, tobacco, and various kinds of vegetables. It is necessary to emphasize again the extreme fertility of these soils and the significant part they have played in the agricultural success of the Basin. 134

Besides the rice paddy soils, on the low hills and high river terraces of part of western Szechuan Basin, particularly in the vicinity north of Chengtu, there are small patches of dark greyish brown coarse soils. Many soil scientists prefer to call these soils "Chengtu Clay."[3] Some people believe these "Chengtu clays" were probably true loesses at one time but have lost their columnar structure and are now characterized by prismatic and cloddy structure.[4]

c) Podsolized old yellow earth.--Third, the grey-brown yellow soils occupying the surrounding hills of the Basin are generally less fertile and are agriculturally unimportant.

d) Other Soils.--On account of the unique geological structure and rock formations of the Basin, one peculiar form of soil erosion has been extensively developed here. With the alternating beds of purple sandstones and shales which have been recently folded and deeply eroded, and in places where the surface slopes of such smooth rock formations correspond to the slopes of hills, soil creep is easily induced. Many times the thin surface soils have been completely removed, leaving only bare rocks. In the case of shales, on account of their comparatively rugged surface, the situation is less grave. Soil creep constitutes one of the most serious problems of agricultural land-use in the Basin, and challenges immediate attention.

3. Agricultural Land-Use and Topography

With the exception of Chengtu Plain and some other minor comparatively broad river valleys (such as the To and Fou River 133 311

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[1] Ibid., p. 121. [2] Ibid., p. 291. [3] Ibid., p. 387.

[4] J. Thorp and D. Dye, "The Chengtu Clays, Deposits of Possible Loessal Origin in Western and Northwestern Szechuan Basin," Bul. of the Geol. Soc. of China, X, No. 2 (1936), 225-46.

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valleys) most of the agricultural lands of the Basin are found on the terraced fields of the innumerable small undulating rolling hills which are found everywhere in the Basin.

In the many small valleys there is generally very little bottom land along the courses of the streams. These streams, as a rule, have deep channels and abrupt banks of sandstones and gravel-conglomerate. But, wherever such bottom lands exist at all, they are extremely fertile. They are, in most cases, terraced for rice culture, provided water can be secured. It is not unusual to observe that tracts after tracts of rice and other crop fields have been terraced along the steep banks of these small valleys.

Generally speaking, the agricultural fields, according to the popular classification commonly used by local peasants, consist of four principal categories, namely, (1) Pa Tien, or plain fields, i.e., fields around the smooth level, flattish fields or broad river bottoms; (2) Kou Tien, or valley fields, within narrow river valleys; (3) Ti Tien, or ladder fields, i.e., terraced fields along hills or any other steep lands; and (4) Shan Tu, or hilly "earth," i.e., detached fragmentary lots on hills or mountains which are too rugged and too difficult for terracing and for cultivation purposes. The relative value of these four classes of land, of course, decreases in the order named. It is particularly interesting to note that the first three categories are real "fields" whereas the fourth is merely "tu" or "earth."

Fields devoted to categories (1) and (2), and some portions of category (3) are in most cases used for wet crops (rice) whereas large portions of categories (3) and (4) are confined to dry (unirrigated) crops. The difference between these two types of land, both in the manner of utilization and in their relative value, is as sharp as the difference between pasture land and farm land in western agriculture.

In short, here in the Basin the topography furnishes one of the dominating forces in shaping many of its geographic patterns. First of all, it practically dictates the whole climatic regime of the region, which, in turn, affects the soil conditions. And all three operate in combination to account for the present patterns of agricultural land-use.

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deposits are generally about 5 to 7 meters deep.[1] It is estimated by some geologists that the rate of the alluvial deposition in Chengtu Plain is at the rate of one foot per century.[2] This assertion and calculation is independently evidenced by recent archaeological excavations near the vicinity of Chengtu. Burial objects of unmistakably Early Han dynasty were discovered at a depth of about seven meters (or about 21 feet).[3] In other words, the geological time of these deposits corresponds fairly closely with the historical times as manifested in the age of the buried Han objects, i.e., both are about 2,100 years old. If both of these assertions are correct, ie., the deposition at the rate of one foot per hundred years, and the maximum deposit being not over 60 meters (or 180 feet) deep, the age of this celebrated rich Chengtu Plain can be no more than 20,000 years. 133

It is interesting to note that as late as the Han dynasty, large parts of the Chengtu Plain were still swampy in nature. This is evidenced by the fact that the most prosperous settlements at that time were not in Chengtu and its surrounding cities, but rather at Ling Tsung (the present Tsung Nai) and the more elevated hilly areas of the Plain.[4]

In addition to the rich, young alluvial deposits, Cheng-tu Plain is further favored, as we shall see later, by the excellent and ingenious irrigation systems, devised by the revered Li Ping and his son about 2,200 years ago. These irrigation systems freed this Plain once and for all from the danger of drought and flood. Here, multitudes of canals and ditches, filled with irrigation water, run through the rice paddy, fields, vegetable tracts, and flower gardens. Through some ingenious devices, as we shall see later, silts are dug off and the principal channels cleared once every year.

The Plain has the further advantage of being watered by streams rising in the mountains where the rainfall is much heavier than that in the Plains, and where the water-supply from snow 3110 133

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[1] Ibid., p. 38.

[2] D. S. Dye, Journal of West China Border Research, IV (1931), 104.

[3] C. T. Shan, "Archaeological Report on the Excavations of Chengtu Plain Areas," Cultural Research Monograph (University of Nanking, 1939). (Unpublished manuscript.)

[4] Hua Yang Kuo Chih, Chuan 2, p. 15.

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311 melting during the summer is reliable. At Kuan-hsien, where the
133 torrent of the Min first enters the Plain and is taken under human control, the waters are divided into several large canals, each of which is subdivided in turn into innumerable smaller canals and ditches. The life-giving waters are impounded by dams, stone revetments, and other devices, and are held for irrigation purposes. The irrigation of the Plain has another advantage in that the soils are seldom troubled by salt and fine mud which often clog irrigated soils in other areas; because the considerable rainfall in Chengtu Plain, with an annual average of about 900 millimeters, is sufficient to prevent such clogging.

134 The soils of Chengtu Plain consist principally of the dark and dark-gray paddy soils. They are formed mainly from alluvial deposits brought down from the rich black soil (chernozem) of the Tibetan border-land and Kokonor (Fig. 9) by the mighty Min River. The natural richness of these soils is enhanced even further by the annual renewal. Because of this fact, soils of the Plain, unlike the paddy soils of many other parts of China, are not strongly podsolized.[1] However, the soil conditions do not appear to be uniform throughout the whole Plain. In fact, there are considerable differences in texture, color, and profile according to slight differences in local relief.[2] For instance, in the upper Min River region, as in Kuan-hsien, the soil texture is much coarser than in the lower Plain areas.[3]

One of the most interesting practices in connection with soil culture in the farms of Chengtu Plain, is the building of little stone wing dams or projections along the stream banks out into the water. Behind these projections, the streams, in the course of a back eddy, deposit silt and sand, which are frequently rich, particularly in organic matters. All these mud accumulations are carefully dug out and carried in baskets to the fields. Many times muddy waters have been led into basins or rice paddies in order that fine fertile silt might be precipitated on the fields.

241 d) Agricultural products of Chengtu Plain.--The Plain is
433 noted for its diversity of agricultural products. It produces

[1] Thorp, op. cit., p. 391.

[2] Ibid., p. 387.

[3] Ibid.

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three and sometimes four crops a year. It is estimated that the annual output of farm products alone include rice, 15,000,000 piculs; wheat, 8,000,000 piculs; other cereals, 2,000,000 piculs; rape seed, 500,000 piculs; tobacco, 700,000 piculs; plus medicinal herbs, vegetables, and other farm products. The total value of all these products at pre-war prices was a little over 180,000,000 dollars, or 45 dollars per capita for the Plain. This production represents about 15 per cent of the total volume of agricultural produce of the whole province, while the area of the Plain is only about one-sixty-seventh of the total area of the province. In other words, the Chengtu Plain produces ten times as much per unit area than the rest of the Basin.

e) Farms and fields.--Among the farm areas of the Basin, Chengtu Plain has the largest average farm. According to a survey by Professor Brown and M. L. Li, the rented farms average 30.1 mow, and the owned farms average 73.1 mow.[1] These figures are almost twice as large as the average size of farms in the Basin as a whole.[2] They are, in fact, even larger than the largest average size of farm in North China.[3] This, of course, means additional wealth and more prosperity. This undoubtedly has accounted for the large farmstead and the well-kept farms throughout the Plain (Fig. 12). Moreover, unlike other parts of the Basin, most of the farms here are not so detached. In general, the individual fields of Chengtu Plain farms are larger. According to the same survey, the average field is 3.36 mow,[4] which is three times as large as that of the hilly areas in the Basin.[5] Larger fields are made possible, of course, by the flatter topography and better water-supply here.

f) Marketing of agricultural products.--The marketing of the diverse agricultural products of the Plain is interesting. Marketing is done mainly in the nearby towns or cities throughout the year. The Plain is dotted with market towns, so that all

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[1] H. D. Brown and M. L. Li, "A Survey of Fifty Farms on the Chengtu Plain," Chinese Econ. Journal, I (1927), 1-59.

[2] Ibid.

[3] Buck, op. cit., p. 273.

[4] Brown and Li, op. cit., p. 28.

[5] H. D. Brown and M. L. Li, "A Survey of Farms of Mountain Omei Areas," Chinese Econ. Journal, I (1927), 1059-76.

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Another interesting characteristic of this agricultural area of the northern Basin is that this area is the most important producing center of a very important semi-agricultural product, the herbs, in the Basin. In addition to the meager subsistent agricultural production, the herb furnishes as a very important "cash crop" for the farmers. This is mainly due to the fact that in this area there are large tracts of land where the slope is too steep and the soils are too shallow for regular crop production. These lands are used, either in cultivated form or in "wild growths" for herbs.

Other outstanding features of this agricultural area include its moderate population density (Fig. 10), its specially thick cypress growths, and the conspicuous absence of coal, iron, nanmu, and pine vegetations.

4. The Combined Agricultural and Forestry Area of the Eastern Basin

In terms of both the agricultural prosperity and the general appearance of its agricultural landscape, this combined agricultural-forestry area of the eastern Basin (Fig. 24) is the least attractive and poorest. Here the topography is dominated by the numerous steep high parallel anticlinal ridges. Plains and gentle hills are even more restricted.

As to soils, in addition to the usual "purple-brown" type of the Basin, there are numerous tracts of soils, old and young yellow earths, which are derived from limestone parental materials. In most cases these soils are shallower in depths than the purple-brown type and are much slower in the rate of renewal. These factors handicap considerably its efficient agricultural production.

The principal crops here are potatoes, hemp, rice, corn, wheat, and kaoliang. Although rice is reported to be grown in every district of this agricultural area, its acreage is more limited here than in any other agricultural area.

The agricultural land-use of this area is controlled largely by its topography. Agricultural lands here are derived from two principal sources, first, on the manger-like trough lands at the top of the broad anticlines wherever the bed rocks happen to be less resistant than the surrounding structures. These trough lands are, however, rather restricted in extensions.

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241 311 Moreover, on account of the high ground water-tables here, the drainage conditions on these trough lands are very poor. These trough lands are sometimes used for wheat, hemp, rice, rape, or kaoliang, depending upon water conditions. But the productivity of these marginal agricultural lands are, in general, very low.

The second principal source of agricultural land-use here is developed on the more gentle slopes of the numerous synclines in this area. Here the slopes are terraced into rice, wheat, or potato fields. The drainage conditions are, in general, better than those in the trough lands of the anticlines. Considerable portions of the cultivated fields are used for Ta ma (hemp) and Tso Tsai (vegetable) cultures which are the two most spectacular agricultural products of this area.

314 The most outstanding feature of this agricultural area, as its name suggests, is the predominance of the forestry product, the tung oil. On the steep slopes or at the edge of the anticlines, where the soils are extremely shallow, great numbers of tung trees are planted. Especially during the past decade, stimulated by the increasing demand, the plantation of tung trees has been grown in leaps and bounds. This area alone now contributes about three-fourths of the total production of tung oil production of all the Basin. In one district, Ning-shui alone, it produces about 32 per cent of the total tung tree production of the Basin. This factor has increased greatly the population-support capacity for this agricultural area and also helps to explain the presence of a few detached high population density areas here (Fig. 10).

135 Another interesting characteristic of this agricultural area is that here lies about 65 per cent of the total coal reserve (Pa-hsien and Chiang-peh) and about 45 per cent of the total iron reserve (Chi-chiang and Wanchuan) of the whole Basin.[1] This remarkable fact suggests that in the future days to come, this agricultural area may abandon its present modest pursuits in agricultural and forestry production, and will soon take an unchallenged leadership in the growing industrial and manufacturing development of the Basin.

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[1] W. C. Chang, "The Iron and Coal Resources of Szechuan," Szechuan Monthly, V, No. 5 (1934), 35.

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5. The Mixed Farming Area of the Southwestern Basin

Among all the principal agricultural regions of the Basin, the mixed farming area of the southwestern Basin (Fig. 24) is the most interesting. Here lies an area like a synthesis of all the above four areas. Besides its own unique quality, as we shall see shortly, this area possesses some characteristics of each and every one of the above four agricultural areas. This condition is true in topography, soil, crop association, and other aspects.

In topography, for instance, this area possesses some of the anticlinal ridges (but lesser in magnitude) like the eastern Basin; some irregular hills like the northern Basin; and some broad plains (in smaller extensions) like the Chengtu Plain, or rather, like the lower To-Pou valleys. However, unlike all the above four agricultural areas, the absolute relief here is, on the whole, the lowest, averaging about 300 meters above sea level.

In soil, this area is also a miniature model of the above four agricultural areas. The usual purple-brown soils of the northern Basin, the limestone soils (old and young yellow earths) of the eastern Basin, and the rich alluvial soils of the Chengtu Plain and To-Pou valleys are all present here (Fig. 9).

In agricultural land-use and crop association this area has the greatest variety of products. The broad river valleys of the Min (lower) and Yangtse furnish fertile fields for rice, sugar-cane, and orange groves. The more hilly lands, terraced in minute steps, are used for corn, wheat, rape, hemp, barley, potato, beans, and other crops. Unlike the other four areas, corn is the most predominant crop here. Moreover, on the steep slopes of the high anticlines, or on other more hilly areas, numerous forestry products, such as tung tree, tea, white wax, mulberry trees, and various kinds of bamboo, are found. Especially, the bamboo products and white wax are the most famous.

Above all, another interesting feature of this area is the bona fide tropical character of its agricultural and horticultural products here. Climatically, with the exception of the southeastern highlands of the Basin, this area is the warmest among all the agricultural areas of the Basin (Fig. 24). Such well known tropical products as Li Chi, Lun yen, bananas, and palm vegetation are found here.

Another special feature of this area is the difference in its water use. Like Chengtu Plain this area is endowed with

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P. Conclusions on Agricultural Land-Use

Agricultural land-use of Szechuan Basin emphasizes the diversity of its agricultural products and the intensiveness of its land-use. The diversified topography, the great variation in availability of water supply, the different degrees of alluviation in different parts of the Basin, and above all, the high population density, all have contributed to the uniquely different agricultural landscapes in various parts of the Basin. The sharp difference between the appearance of Chengtu Plain and the rest of the Basin is particularly striking.

Geographically, it is interesting to note that in this area people with limited technological knowledge at their disposal have struggled through long ages of painstaking experiment, successes and failure, by trial and error, to find out the most effective way to wrest a living from the none-too-favorable environment. For ages, the Szechuanese have employed their ingenuity, their patience, and their tremendous man-power in trying to utilize every available spot of land for whatever type of crops would grow under its particular physical qualities.

The tremendous work of terracing; the diversified methods and ingenious devices for irrigation; the unique methods of soil culture, green manure, and fertilization composting; the complicated systems of rotating crops; the synchronization of the seasons of planting of various crops; and the elaborate and widespread practices of inter-culture, are all good examples of the effort to attain intensive agricultural land-use and greater production.

Here, in the Szechuan Basin, one finds a most distinctive case of how man and Nature have worked together, hand in hand, and it is plain that the vast human effort has served as the most important single factor in shaping the present patterns of agricultural land-use. The building and maintenance of various kinds of irrigation works, the terracing of huge hills into minute steps, the various practices of soil culture (such as carrying soil from lower slopes to higher fields), all these in the absence of mechanical power, require a stupendous army of labor. In addition, there are the stupendous and astounding job of transforming the dry fields in winter crops (such as wheat, beans, etc.) into wet fields for rice, and transplanting millions of young rice plants (one by one, by hand), within the short period of two weeks

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in early spring every year. Such agricultural practices and such intensive use of land as now prevail here in the Basin can only be maintained by abundant and cheap labor. In fact, it is the pressure of large numbers of men on the land that has resulted in the unique pattern of agricultural land-use here. 311 241

Owing to the crowded population, to the limited land area, and to the extremely low standard of living, it is imperative to the Szechuanese that every inch of land which is cultivable at all be brought under cultivation. Many times, of course, this means very low production efficiency per capita.

The crop systems in the Basin are so adjusted and so synchronized as to utilize each piece of land to the maximum. For instance, if physical conditions, particularly water supply, permit, rice is always the preferred crop. If rice cannot be grown, the next best crop, such as wheat, corn, millet, or barley, will be planted. If even these crops are impossible, still other crops will be grown, and the land put to some productive use. The simple truth is that here millions of mouths have to be fed, and the Szechuanese absolutely cannot afford to let their land lie idle if this can be avoided in any way. Given the known physical assets, with the available technological knowledge, one may fairly say that the Szechuanese, so far as agricultural land-use is concerned, have made a shrewd "deal" with their physical surroundings. Another people with the same equipment, under the same conditions, both physical and cultural, perhaps could not have done in any way materially different from the Szechuanese.

Nevertheless, in spite of all that has been said above, the agricultural land-use of Szechuan Basin, especially in the light of modern technological development and in the face of modern scientific agriculture, cannot be said to be wholly satisfactory. As a matter of fact, many of the Basin's practices in agricultural land-use are miserably inefficient and call for drastic and immediate improvement. The extreme heterogeneity of the seed of nearly all the field crops, the lack of scientific seed selection and plant-breeding station, the marginal character and low efficiency of the production in many hilly areas, the lack of good drought-resistant crops in areas where natural rainfall is undependable, the failure in cotton-culture, the financial inability to obtain modern complete chemical fertilizers, the wasteful practices of the so-called "winter-storing-water-field"

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241 system, and above all, the inefficiency of many of the superfluous ditches and irrigation works, are notable examples. The successful solution of any of these problems will undoubtedly bring about a higher efficiency in the agricultural land-use of the Basin.

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TABLE 2

INDEX OF CULTIVATED LAND TO TOTAL LAND AREA IN SZECHUAN BASIN (1939)

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Name of District	Total Land Area (In Sq. Kilometer)	Total Cultivated Area (In Sq. Kilometer)	Ratio of (3) to (2) in Per Cent
1. Ching-Hua.....	2,875	86	0.3
2. Li-Fan.....	9,667	24	0.2
3. Miao-Hsien.....	4,940	203	4.0
4. Pai-Chuan.....	1,716	87	5.0
5. Ping-Wu.....	6,097	198	3.0
6. Chao-Hua.....	1,541	523	34.0
7. Kuang-Yuan.....	6,151	923	15.0
8. Nan-Chiang.....	4,666	1,045	22.0
9. Tung-Chiang.....	4,980	996	20.0
10. Wan-Yuan.....	4,117	527	13.0
11. Cheng-Ko.....	4,307	215	5.0
12. Pu-Hsi.....	3,156	158	5.0
13. Pu-Shan.....	2,646	265	10.0
14. Miao-Kung.....	18,734	23	0.1
15. Wen-Chuan.....	3,378	34	1.0
16. An-Hsien.....	1,428	500	35.0
17. Chang-Ming.....	939	188	21.0
18. Chiang-Yu.....	2,651	1,398	53.0
19. Chien-Ko.....	3,457	1,069	31.0
20. Tsang-Hsi.....	2,399	719	30.0
21. Pa-Chung.....	4,737	1,128	24.0
22. Hsuan-Han.....	4,340	1,302	30.0
23. Kai-Hsien.....	3,700	1,295	35.0
24. Yun-Yang.....	3,369	842	25.0
25. Feng-Chieh.....	4,457	1,114	25.0
26. Pao-Hsin.....	1,679	56	3.0
27. Kuan-Hsien.....	989	692	70.0
28. Peng-Hsien.....	895	627	70.0
29. Shih-Feng.....	746	597	80.0
30. Mien-Chu.....	638	510	80.0
31. Lo-Chiang.....	699	489	70.0
32. Mien-Yang.....	1,565	1,174	75.0
33. Tzu-Tung.....	595	208	35.0
34. Nan-Pu.....	2,922	979	33.0
35. Nan-Chung.....	1,481	518	35.0
36. I-Lung.....	1,578	394	25.0
37. Ying-Shan.....	1,764	648	37.0
38. Ta-Hsien.....	3,549	1,242	35.0
39. Kai-Chiang.....	1,040	624	60.0
40. Wan-Hsien.....	3,667	2,200	60.0
41. Tsung-Nai.....	1,503	1,052	69.0
42. Ta-I.....	1,081	757	70.0
43. Tsung-Ching.....	1,116	837	75.0
44. Nen-Chiang.....	251	213	85.0
45. Tsung-Nin.....	178	151	85.0
46. Pi-Hsien.....	273	232	85.0
47. Sin-Fang.....	159	116	73.0

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TABLE 2—Continued

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Name of District	Total Land Area (In Sq. Kilometer)	Total Cultivated Area (In Sq. Kilometer)	Ratio of (3) to (2) in Per Cent
48. Sin-Fu	344	236	70.0
49. Kuang-Han	499	399	80.0
50. Te-Yang	512	410	80.0
51. Chung-Chiang	2,456	1,615	66.0
52. San-Tai	2,733	1,366	50.0
53. Yen-Ting	595	208	35.0
54. Si-Chung	999	749	75.0
55. Nan-Chung	2,636	1,978	75.0
56. Peng-An	1,638	1,147	70.0
57. Chu-Hsien	1,657	647	39.0
58. Ta-Chu	1,826	913	50.0
59. Liang-Shan	2,408	1,686	70.0
60. Chung-Hsien	1,569	785	50.0
61. Shih-Chu	2,071	632	31.0
62. Ning-Shan	622	159	26.0
63. Pu-Chiang	501	320	64.0
64. Sin-Tsing	316	268	85.0
65. Peng-Shan	425	298	70.0
66. Shuan-Liu	288	244	85.0
67. Hua-Yang	987	813	85.0
68. Cheng-Tu	246	208	80.0
69. Ching-Tan	1,411	1,129	80.0
70. Chien-Yang	2,502	1,501	60.0
71. Lo-Chi	1,158	810	70.0
72. Siu-Ning	1,814	1,451	80.0
73. Peng-Hai	1,974	987	50.0
74. Shei-Hung	1,399	1,042	74.0
75. Wu-Cheng	1,079	863	80.0
76. Yo-Chi	1,859	1,394	75.0
77. Kuang-An	1,707	854	50.0
78. Liang-Shui	1,897	894	47.0
79. Tien-Chiang	8,865	597	6.8
80. Peng-Tu	858	478	56.0
81. Peng-Shui	9,131	1,117	15.0
82. Chien-Chiang	2,257	336	15.0
83. Yu-Yang	3,665	1,078	29.0
84. Siu-Shan	1,440	432	30.0
85. Tang-Ling	724	289	40.0
86. Nei-Shan	1,035	517	50.0
87. Jen-Shou	2,516	1,510	60.0
88. Tru-Yang	1,733	1,213	70.0
89. An-Yo	2,768	1,661	60.0
90. Tung-Nan	1,751	1,225	70.0
91. No-Chuan	2,840	1,989	70.0
92. Chiang-Pei	2,472	1,730	70.0
93. Chang-Sheo	1,138	667	56.0
94. Pei-Ling	5,520	3,312	60.0
95. Hung-Ya	1,523	228	15.0
96. Chia-Chiang	420	128	31.0
97. Ching-Shen	409	205	50.0

7: Hu K-5 (1934-) 1946 AF16 Southwest China AF16

TABLE 2—Continued

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Name of District	Total Land Area (In Sq.Kilometer)	Total Cultivated Area (In Sq.Kilometer)	Ratio of (3) to (2) in Per Cent
98. Ching-Yen.....	628	408	65.0
99. Yung-Hsien.....	1,965	786	40.0
100. Wei-Yuan.....	781	482	60.0
101. Tzu-Chung.....	1,905	1,324	70.0
102. Lei-Chiang.....	1,599	1,119	70.0
103. Yung-Chang.....	899	629	70.0
104. Ta-Cho.....	1,316	658	50.0
105. Tung-Liang.....	1,497	898	60.0
106. Pih-Shan.....	8,111	568	7.0
107. Pa-Hsien.....	3,312	1,656	50.0
108. Nan-Chuan.....	3,029	382	13.0
109. O-Pien.....	2,738	237	9.0
110. O-Mei.....	1,272	367	29.0
111. Lo-Shan.....	1,867	933	50.0
112. Chien-Wei.....	1,954	684	35.0
113. I-Ping.....	4,230	2,961	70.0
114. Pu-Shun.....	2,207	1,544	70.0
115. Lung-Chang.....	761	496	66.0
116. Lu-Hsien.....	2,913	2,185	75.0
117. Yung-Chuan.....	1,288	902	70.0
118. Chiang-Tsin.....	3,253	1,626	50.0
119. Chi-Chiang.....	1,839	276	15.0
120. Lei-Po.....	4,814	481	10.0
121. Ma-Pien.....	2,624	136	5.0
122. Ping-Shan.....	2,891	848	29.0
123. Kao-Hsien.....	1,394	120	9.0
124. Ching-Fu.....	1,077	538	50.0
125. Nan-Hsi.....	957	680	75.0
126. Chiang-An.....	740	447	60.0
127. Nou-Hsi.....	477	344	72.0
128. Ho-Chiang.....	2,329	797	34.0
129. Yung-Lien.....	342	122	36.0
130. Chi-Hsien.....	1,197	104	9.0
131. Chang-Ning.....	1,295	307	24.0
132. Hsing-Wen.....	526	195	37.0
133. Ku-Sung.....	598	167	28.0
134. Siu-Yung.....	2,916	114	4.0
135. Ku-Ning.....	5,589	381	7.0
136. Sung-Pan.....	50,139	20	0.04
Total.....	360,159	100,787	28.9

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Hu, and the Ying-hsing Hu.[11]

6. The Hsi-k'ang Tibetan Plateau Lands

While Hsi-k'ang is somewhat peripheral to our present study, the close relationship to western Ssu-ch'uan and northern Yun-nan of eastern Tibet or Kam (Hsi-k'ang means "Western Kam") makes it desirable to examine its geographical situation. In any event the valleys of the Ya-lung Chiang, the An-ning Ho, and the Ta-tu Ho with its tributaries the Ta-chin Ch'uan (Great Gold River) and Hsiao Chin Ch'uan (Little Gold River) have figured since ancient times in Chinese history, and Lhasa has never had any real claim to the high plateau country east of the Chin-sha Chiang. The boundary between Tibet and China settled by the Manchu Emperor and the Tibetans in 1727 and lasting down to 1910 ran from the Mekong just north of A-t'un-tzu, crossed northward into the Chin-sha Chiang valley and followed the water divide between the Chin-sha and the upper Mekong sources to the Kokonor Territory.[12]

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Photo 4. Shuang-chiang, Yun-nan Province (23° 29' N, 99° 50' E)

In this panorama, the viewer looks northwestward along the ridge of the Pang-ma Shan, the highest point of which culminates at the 10,608 feet high Liang Shan in the left center background. The large forest remnant in the foreground is on the southern end of the Pang-ma Shan just northwest of Shuang-chiang town. Here is dramatically contrasted the dense forest vegetation that once covered all of South China with the denuded slopes that comprise the large percentage of South China mountainland today. The slash-burn, shifting cultivators that comprise the mountain tribes are largely responsible for this situation, although ultimately the cause is attributable to the pressure of the Han-Chinese who have crowded out the mountain tribes and prevented natural regrowth to take place. While the mountain tribes prefer their cool heights, the Pa-yi basin dwellers are found usually only in the low, hot valleys such as that at the right of the photo where the low fields may be flooded for wet-rice cultivation.

175 prising this area. The famous engineer, Li Ping, was sent to administer Shu as governor, and it was at this time that Li Ping and his son developed the Kuan Hsien irrigation system still operating today.[5]

According to Hsu, the fact that the Chuang people of present-day Ssu-ch'uan, Yun-nan, Kuei-chou, and Kuang-hsi still sacrifice to the two irrigation deities gives added proof that the Southwestern Yi of Han times included the Pa and Shu peoples in their group. The indigenous Chuang of the provinces of Kuang-tung and Kuang-hsi do not honor these deities, however, and this would indicate that their migration there must have occurred prior to the end of the Chou Dynasty and the Warring States Period. It also points to the far-reaching spread of Shu-shan culture, while other cultural ties indicate that the indigenous Chuang of Ling-nan are of the same stock as those of Pa and Shu.

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Photo 6. Lu Hsien, Ssu-ch'uan Province (28°54' N, 105° 27' E)

133 311 When the Chin-sha Chiang runs out of Yun-nan to become the Yang-tzu River, it enters a great basin that once contained a vast inland sea in what is now Ssu-ch'uan Province. With long erosion considerable unevenness has developed that makes the local sandstone topography precipitous but without great elevation differences. From the air the eroded sea-bed aspect can be perceived without much imagination, an aspect that is supported by the meandering character of the streams. This is seen not only in the great bends of the mighty Yang-tzu, but also in the small tributary between two of the Yang-tzu bends. A surprisingly large proportion of the basin surface, therefore, is under cultivation to support in Ssu-ch'uan the largest provincial population in China. From dry-cropped flat-topped lake-bottom remnants standing along the sky-line, tiered paddy fields lead step-like down to the river floodplains. In B.C. times, this was part of the prosperous T'ai kingdom of Shu. The foreground shows the important Han-Chinese city of Lu Hsien where the road from Ch'ung-ch'ing to K'un-ming crosses the Yang-tzu. This was one of the last territories yielded up by the southward moving early T'ai migrants en route to the Kuei-chou and Yun-nan basin lands.

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and southwest China. In the eastern part of Hsi-k'ang the valley of the An-ning Ho, a tributary of the Ya-lung Chiang just before the latter joins the Chin-sha (Upper Yang-tzu) River, early became an important military route for southward-reaching conquerors. This route not only is fashioned for north-south travel, but provides a large rice basin where the present capital city, Hsi-ch'ang is located. It is doubtful that this was ever occupied by T'ai people, for this is in the midst of the Lolo country.

Undoubtedly the Kuei-chou plateau and mountain land played an important role in the separate development of the two principal directions of the T'ai thrust, that is, the thrust up the Yang-tzu into the Yun-nan lake basins, and the thrust southward into Ling-nan and the land of Nan-Yueh, present-day Kuang-tung and Kuang-hsi. These two regions have had significant early T'ai political organizations and they are still important centers of the T'ai remnants within China. Their historical development differed. Ling-nan was in the direct path of the Ch'in thrust for empire, and the T'ai had been here for many centuries before the Ch'in. Yun-nan, on the other hand, was probably entered by the T'ai only shortly before the Ch'in unified the

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Photo 8. Ts'ao Hu, Kuei-chou Province (26° 52' N, 104° 17' E)

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Ts'ao Hu in central Kuei-chou Province is one of the two lakes of a significant size in Kuei-chou, the other being in southwestern Kuei-chou near the Kuang-hsi border. This lake basin lies along one of the most important routes connecting Ssu-ch'uan Province with Yun-nan Province. It contains one of the few relatively large paddy areas in Kuei-chou and was early a Han-Chinese administrative center and military base for the conquest and control of the Miao and Lolo tribes of the province. The far left shore of Ts'ao Hu seen here from the west is the site of Wei-ning, the district seat and one of the larger towns of the province. Prior to Han-Chinese entry to this part of China, rice-farming T'ai tribes occupied the basin, while Lolo tribes farmed the surrounding mountains. With the increasing southwestward push of the Han-Chinese, the T'ai tribes migrated farther toward the southwest frontiers.

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